



## **CITY OF KIRKLAND**

123 Fifth Avenue, Kirkland, WA 98033 425.587.3000  
www.ci.kirkland.wa.us

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### **MEMORANDUM**

**To:** Marilynne Beard, Interim City Manager

**From:** Grace Steuart, Fire Marshal  
Tom Phillips, Building Services Manager

**Date:** May 6, 2010

**Subject:** Possible Adoption of Requirement for Fire Sprinklers in New Single Family Homes

### **RECOMMENDATION:**

That City Council give direction to the Fire/Building Department to move forward with the adoption of Appendix S of the International Residential Code, thus requiring fire sprinklers in all new single family homes effective July 1, 2010.

### **BACKGROUND:**

In July of this year, Kirkland will be adopting the new International Codes with state and local amendments. Since 2007, the Public Safety Committee has discussed whether to require fire sprinklers in all new single family homes. The general consensus has been that requiring sprinklers would provide a high degree of fire safety for our community. This may be accomplished by adopting Appendix S of the International Residential Code, which would become effective on July 1, 2010.

At the Public Safety Committee on February 18, 2010, staff was directed to bring this issue to a regular Council meeting. In March 2010, a memo was placed in the Council's reading file, which provided information regarding the advantages of installing fire sprinklers in all new single family homes. This issue is now on the agenda for May 18, 2010.

### **Facts about Sprinklers**

- **National statistics show that 82 percent of fire deaths occur in homes.** According to the National Fire Protection Association, of the 3,320 civilian fire deaths that occurred in 2008, 2,780 died in residential fires; and of those, 2,365 occurred in one and two-family dwellings. (These statistics have been replicated

in those jurisdictions that have required sprinklers for several years, including Prince George's County, Maryland.)

- **Viable escape times in a typical home fire have dropped from 17 minutes to approximately 3 minutes in the last 30 years**, due to a shift in contents from natural products and fibers to synthetic materials. The primary fuel load available in the early stages of a residential fire is the contents (i.e. furnishings, etc.) inside the house, not the structure of the house itself.
- **A combination of smoke detectors AND residential sprinkler systems doubles residential fire survival rates.** Research indicates that installing smoke detectors alone improves survival rates for residential fires by 50%; however, installing smoke detectors AND a residential fire sprinkler system improves survival rates by 97%.
- **When fires do occur in homes equipped with automatic fire sprinkler systems, property losses are much lower.** Based on a 15 year study from the City of Scottsdale, Arizona, the average loss for a fire incident in a sprinklered building was over 90% less than the average loss in a structure in which automatic sprinklers were not present.
- **Sprinklers help save firefighters' lives.** According to recent NFPA studies:
  - A great number of residential occupancies are now being built using lightweight construction materials.
  - Although these materials reduce construction costs and have consistently demonstrated equivalent or even superior quality under non-fire conditions, the same cannot be said when these materials are exposed to fire loading during a residential structure fire.
  - The result is progressive structural collapse due to the failure of these lightweight structures, resulting in firefighter injuries and death.
- **Sprinklers are good for the environment.** When a fire occurs in a sprinklered versus a non-sprinklered home:
  - The release of greenhouse gases (CO<sub>2</sub>) are reduced
  - The amount of water usage is reduced
  - The amount of fire damage is less, resulting in less material being sent to local landfills
- **Sprinklers save City resources by reducing costs associated with fire suppression and investigation activities.** The initial response to any structure fire would be identical, however:
  - The resources dedicated to the unsprinklered structure fire is often hours, taking engines out of service thus extending response times for any other subsequent emergencies

- In the case of a sprinklered structure, all but a single fire engine would be returned to service in a matter of minutes
- Subsequent fire investigation costs in a sprinklered building would be reduced significantly. Since the structure would be less damaged, evidence would be preserved, fires could be investigated more quickly, using fewer investigators, less manpower, and less equipment
- **Other common questions regarding sprinklers**
  - **Won't the presence of automatic fire sprinklers increase the risk of water damage?** When properly installed, the presence of automatic fire sprinklers in a home pose no greater risk than the potable water piping already present in the home. In fact piping for automatic fire sprinkler systems are required to meet a higher standard than conventional potable water piping.
  - **Will I be required to sprinkler the whole house?** The 13D standard specifically allows sprinkler protection to be omitted in non-living areas (garages, attics and crawlspaces)

### **Facts about Kirkland**

- **Flashover often occurs before the Fire Department arrives.** Current average response times in Kirkland are between 5.28 and 5.88 minutes; adding to this the time it takes for a fire to be noticed and an alarm to be called in to 9-1-1, this is well above the 3 minute time frame during which "viable escape" is estimated to be possible from a burning home.
- **Houses are larger and closer together, increasing potential for fire spread.** Land costs in Kirkland continue to increase and lot sizes decrease, so homes are closer together, thus creating a larger potential for a fire spreading to neighboring properties
- **We are approaching this as a life safety issue for residential occupancies only**
  - The threshold for buildings other than residential would remain at 5,000 square feet.
  - Smaller commercial or industrial buildings (such as coffee stands, storage buildings, carports, etc) would not be affected.
- **Cost**
  - **The average cost to sprinkler a home in Kirkland is approximately \$2 per square foot** (this figure is based on discussions with local sprinkler contractors for a standard 13D system); the average size of a house in Kirkland (based on 2007-2008 statistics) is 4,300 square feet.

Thus, sprinkler cost for an average new home in Kirkland is approximately \$8,600, or about 1% of the purchase price of the home.

- **Kirkland has among the most reasonable permit fees in our area** (\$180-\$240 depending upon size of house; this fee includes all required inspections)
- **The typical residential system is designed to use the domestic meter**, which is slightly upsized to provide enough capacity for the sprinklers. The customer is not charged for the larger meter if the upsizing is solely for sprinklers.
- **Multi-purpose flow-through type systems are also allowed.** These systems integrate with a home's plumbing system, thus eliminating the need for and added expense of a backflow prevention device.

### Summary

Based on the above information, staff recommends that fire sprinklers be required in all new residential construction. We now need the Council's instructions as to whether we should go forward with including residential fire sprinklers during the regular Code adoption process.

Attachments: US Fire Administration pamphlet: *Home Fire Protection – Residential Fire Sprinkler Systems Save Lives*  
NFPA Fire Sprinkler Initiative study: *Home Fire Sprinklers - Good for the Environment*  
Home Fire Sprinkler Coalition publication: *Benefits of Residential Fire Sprinklers: Prince George's County 15-year History with its Single family Residential Dwelling Fire Sprinkler Ordinance*



U.S. Fire Administration

# Home Fire Protection

Residential Fire Sprinkler Systems Save Lives

FA-43/February 2008



FEMA

# Home Fire Protection Residential Fire Sprinkler Systems

## Sprinkler Systems in Industry

Schools, office buildings, factories, and other commercial buildings have benefited from fire protection sprinkler systems for over a century. To protect investments in buildings and machinery, the textile mills in New England began using sprinkler systems over 100 years ago following a series of devastating fires that claimed many lives and destroyed entire businesses.

## Sprinklers in Homes

But what about our homes? Although we protect our businesses, what actions do we take to protect our families, our homes, and our possessions from fire? Millions of Americans have installed smoke alarms in their homes in the past few decades, but a smoke alarm can only alert the occupants to a fire in the house...it cannot contain or extinguish a fire. Residential sprinkler systems can!

## Sprinklers—The Solution

Fires in residences have taken a high toll of life and property. In 2006 there were

- 412,500 residential fires;
- 2,620 civilian fire deaths;
- 12,925 civilian fire injuries; and
- over \$7 billion in property damage.

Data Source: "Fire Loss in the U.S. During 2006," NFPA

Studies by the Federal Emergency Management Agency's (FEMA) U.S. Fire Administration (USFA) indicate that the installation of residential fire sprinkler systems could have saved thousands of lives, prevented a large percentage of those injuries, and eliminated hundreds of millions of dollars in property losses.

## Advantages of Newly Designed Home Sprinkler Systems

### Fast Response

Residential sprinklers listed by Underwriters Laboratories (UL) are now available. They are designed to respond to a fire much faster than currently available standard commercial and industrial sprinkler systems. The new home sprinklers react automatically to fires more quickly because of their improved sensitivity.

### Low Cost

At the present time, cost of a home sprinkler system is targeted at approximately \$1.00 to \$1.50 per square foot in new construction. It is hoped that the cost will decrease as the use of home fire protection grows. It is also possible to retrofit existing homes with sprinkler systems.

### Small Size

For residential systems, the sprinklers will be smaller than traditional, commercial, and industrial sprinklers, and can be aesthetically coordinated with any room decor. Sprinklers can be installed flush with walls and ceilings.

### Minimal Installation Work

When homes are under construction or being remodeled, a home sprinkler system will require minimal extra piping and labor. Typically, systems are concealed above ceilings and in the walls.

### Low Water Requirement

These systems will require less water than the systems installed in industrial or commercial establishments and can be connected to the domestic water supply.

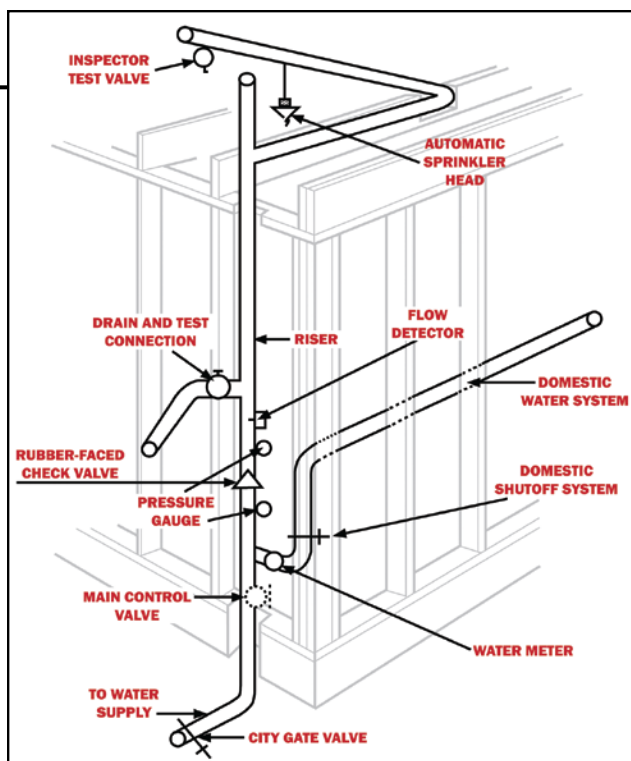
### Piping Requirements

The use of plastic pipe has brought down the cost of installation in new construction and the retrofit of existing dwellings.

## A Growing Number of Communities Promote Home Fire Sprinklers

The following communities represent a cross-section of jurisdictions that have adopted residential sprinkler ordinances. For a more complete list, refer to the Residential Fire Safety Institute (RFSI) Web site at [www.firesafehome.org](http://www.firesafehome.org)

- Scottsdale, AZ;
- Cobb County, GA;
- Prince George's County, MD;
- Livermore, CA;
- Long Grove, IL;
- Chapel Hill, NC;
- Germantown, TN; and
- Altamonte Springs, FL.



## Test Your Home Sprinkler System I.Q.

Here are five statements about home sprinkler systems. Are they true or false?

### 1. When one sprinkler goes off, all the sprinklers activate.

False! Only the sprinkler over the fire will activate. The sprinkler heads react to temperatures in each room individually. Ninety percent of fires are contained by the operation of one sprinkler.

### 2. A sprinkler could accidentally go off, causing severe water damage to a home.

False! Records compiled for well over 50 years prove the likelihood of this occurring is very remote. Furthermore, home sprinklers are designed specifically and tested rigorously to minimize such accidents.

### 3. Water damage from a sprinkler system will be more extensive than fire damage.

False! The sprinkler system will limit a fire's growth severely. Therefore, damage from a home sprinkler system will be much less than the smoke and fire damage if the fire had gone on unabated, or less than the water damage caused by water from firefighting hoselines.

### 4. Home sprinkler systems are expensive.

False! Current estimates suggest that when a home is under construction, a home sprinkler system costs approximately 1 to 1.5 percent of the total building price.

### 5. Residential sprinklers are ugly.

False! The traditional, commercial-type sprinklers as well as sprinklers for home use now are being designed to fit in with most any decor.

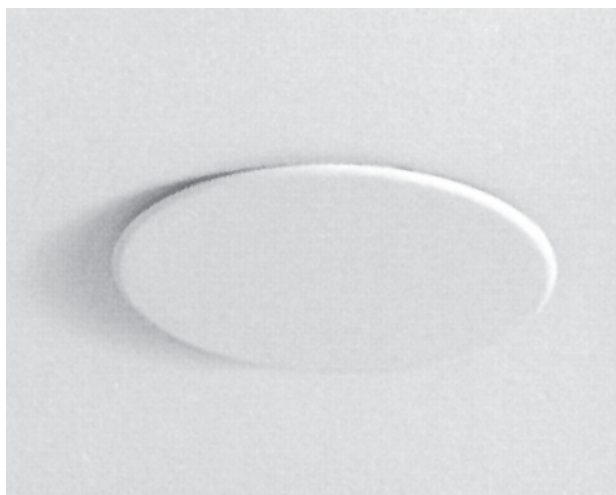
## Sprinklers are a Good Investment for Homebuilders

Through the use of construction tradeoffs, homebuilders and developers can achieve reduced construction costs if residential sprinkler systems are installed.

Home sprinkler systems offer both safety and financial advantages to homebuyers, a rare combination.

## Incentives: Who Benefits?

	Developer	Builder
Reduced impact fees	X	X
Increased density	X	
Reduced fire flow	X	
Hydrant spacing increased	X	
Longer access road distance	X	
Longer distance from fire stations	X	
Reduced access to building sides	X	
Narrower streets	X	
Fewer parking restrictions	X	
Longer cul-de-sacs	X	
Reduced turnaround radius	X	
Reduced permit fees		X
Reduced or exempted plan review fees		X
Reduced or exempted fees for field inspections	X	
Reduced fire resistance ratings, no parapet walls	X	
Increased distance to exits		X



Concealed sprinkler

## Sprinklers are a Good Investment for the Homebuyer

- A fire occurs in a residential structure every 79 seconds according to the USFA. To the homebuilder, this fact means that a large share of potential customers now have knowledge of the terror and destruction caused by fire.
- Families with children, senior citizens, and handicapped members have special fire protection needs. Home sprinkler systems provide added protection for these people.
- In case of a home fire, firefighters will have less risk of injury or life loss since they will be fighting a fire of less intensity.
- Allocation of community resources can be improved with the adoption of home sprinkler technology.
- Communities will be able to make better use of available land and thereby increase their tax base.

## Insurance Discount

Insurance from homeowner underwriters will vary, depending on type of coverage. The discounts now range between 5 and 15 percent, with a projected increase in available discounts.

## The Move Toward Home Sprinkler Systems

The USFA's research in home fire sprinkler systems successfully focused on systems that would be low cost, fast acting, and reliable. As a result, residential fire sprinklers have gained increased acceptance.

In November 1980, the National Fire Protection Association (NFPA) adopted NFPA 13D, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes*. The Standard is based on

technical data from the comprehensive full-scale fire tests that were sponsored by the USFA.

## Residential Sprinkler Program

Dedicated to reducing this Nation's staggering loss of life and property caused by fire, the USFA has joined with private industry and the fire service to advance the development of residential sprinklers. Since 1976, the USFA has promoted research studies, development and testing, and demonstrations of residential sprinkler systems.

*Working with the USFA are*

American Fire Sprinkler Association  
 Center for Campus Fire Safety  
 Consumer Product Safety Commission  
 Factory Mutual Research  
 Home Fire Sprinkler Coalition  
 Home Safety Council  
 International Association of Fire Chiefs  
 Lubrizol Advanced Materials, Inc.  
 NIST/Center for Fire Research  
 National Association of State Fire Marshals  
 National Electrical Manufacturers Association  
 National Fire Protection Association  
 National Fire Sprinkler Association  
 Operation Life Safety  
 Polyurethane Foam Association  
 Residential Fire Safety Institute  
 Sleep Products Safety Council  
 Society of Fire Protection Engineers  
 Tyco  
 U.S. Department of Housing and Urban Development (HUD)  
 Underwriters Laboratories, Inc.  
 University of Maryland  
 Uponor/Wirsbo  
 Worcester Polytechnic Institute, and many others

*For more information or copies  
 of this publication, please contact:*

U.S. Fire Administration  
 16825 South Seton Avenue  
 Emmitsburg, Maryland 21727  
 800-561-3356  
[www.usfa.dhs.gov](http://www.usfa.dhs.gov)

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## NFPA's Fire Sprinkler Initiative

**NFPA's "Fire Sprinkler Initiative: Bringing Safety Home" provides resources for the fire service and other sprinkler advocates who want to demonstrate the need for home fire sprinklers in their community.**

02/23/2009

### Home Fire Sprinklers: Good for the Environment

Lots of people have been inquiring about the environmental benefits of home fire sprinklers. It is an issue of great interest because as policy makers are busy debating how to implement "green initiatives" it is important to highlight the environmental benefits of fire sprinklers. One more argument to bring into any future discussion of residential fire sprinkler adoptions.

Many experts agree that fire sprinklers are good for the environment. I'd like to share excerpts from a comprehensive article I found on the subject, courtesy of [ARAContent](#) on the eco-benefits of residential fire sprinklers that pretty much sums it up. Some of the content cited in the article comes from the [Home Fire Sprinkler Coalition](#) and the [Scottsdale Report](#).

- Fire hoses, on average, use more than eight times the water that sprinklers use to contain a fire. The typical sprinkler system will use 341 gallons of water. In comparison, a firefighter's hose will use roughly 2,935 gallons in a single fire. The reduced amount of water consumption equates to less groundwater runoff. Those thousands of gallons of water from the firefighters' hoses have to flow somewhere. And they do – right into groundwater supplies – along with all the toxins and debris that are disbursed from the fire.
- A fire sprinkler system also reduces the amount of toxins being released into the air. A free burning house fire effects air quality from burning polyester, insulation and dry wall; plus all the household cleaners and chemicals found in a typical home. Home fire sprinklers contain and often extinguish a fire in less time than it would take the fire department to arrive on the scene. That minimizes the amount of time the structure and contents are burning and spewing toxins.
- Landfills are another concern resulting from an uncontrolled house fire. Whether a house is completely destroyed in a fire or is only damaged, tons of building materials, furnishings and other ruined possessions are hauled to the dump. According to a green building guidelines report created by the Alameda County Waste Management Authority (San Leandro, Calif.), it's estimated that 21 percent of materials disposed in county landfills are construction and demolition debris. Rebuilding a home will not only require new building materials but also generates tons of construction waste. The report states that total construction waste generated from one 2,000-square-foot new home is nearly 13 tons.

Water usage, groundwater runoff, toxins in the air, and landfill overcrowding are the more serious environmental concerns created by a household fire – aside from the obvious life-threatening effects. All of these can be minimized and, in some cases, eliminated with the installation of a properly working fire sprinkler system.

Stay tuned for future studies and testing on the eco benefits of residential fire sprinkler systems.

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Posted at 06:30 AM in [Are sprinklers green?](#) | [Permalink](#)

**TrackBack**

# BENEFITS of RESIDENTIAL FIRE SPRINKLERS:

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Prince George's County  
15-Year History with its  
Single-Family Residential Dwelling  
Fire Sprinkler Ordinance



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Prepared by Steve Weatherby  
August 2009

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Produced in cooperation with the Home Fire Sprinkler Coalition, University of Maryland University College, Prince George's County Fire Department and the Maryland State Fire Marshal's Office.



**Home Fire Sprinkler®**

**COALITION**  
Protect What You Value Most™

[HomeFireSprinkler.org](http://HomeFireSprinkler.org)

## Acknowledgements

*This study would not have been possible without the help of the following individuals:*

**Maryland State Fire Marshal William Barnard**

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Prince George's County Fire/EMS Department**

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Maryland Fire and Rescue Institute**

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## Executive Summary

In 1992, Prince George's County in Maryland enacted an ordinance mandating the installation of automatic fire sprinkler systems in new one- and two-family structures. Through a partnership with the Home Fire Sprinkler Coalition (HFSC), the Maryland State Fire Marshal's Office, the Prince George's County Fire Department, and the University of Maryland University College, a study was conducted to review Prince George's County's experience with this ordinance over the 15-year period of 1992-2007.

The most obvious benefit of the ordinance is the direct impact that home fire sprinkler systems have made in saving lives and reducing fire-related injuries.

From 1992-2007, there were 101 fire deaths and 328 civilian injuries in single-family or townhouse fires that were not protected with fire sprinkler systems. No fire deaths occurred in sprinklered-structure fires during the period studied, and there were only six civilian injuries.

Property protection is another important benefit. Looking at the average loss per event in a structure that did not have a residential sprinkler system installed, the damages averaged \$9,983 per incident, and \$49,503 per incident when there was a fatality. The average loss for a single-family/ townhouse structure protected by fire sprinklers was \$4,883 per event. Having sprinklers cut the property loss by almost one-half.

Prince George's County experienced 13,494 single-family or townhouse fires during the period,

with an average of 900 fires per year. The County's total fire loss for single-family/townhouse structures topped \$134 million, averaging almost \$9 million per year. Prince George's County's data indicates that more than 45,000 permits were issued for single-family/townhouse structures from 1992 through 2007, with an average issuance of 3,019 permits per year.

During the period studied, Prince George's County Fire Department (PGFD) recorded 245 sprinkler activations in single-family and townhouse structure fires. In the 245 activation incidents, PGFD recorded no lives lost and only six civilian injuries. PGFD reports 446 residents were present in the structures during the time of sprinkler activation. More than 80 of those residents were present when sprinklers activated during the hours of 10:00 p.m. to 5:59 a.m., which is the most common time for fire deaths to occur, according to NFPA fire data. In the 245 activation incidents, the PGFD estimated the fire loss at \$1,352,820, compared to a total potential loss of \$42,578,420.

The cost impact to developers/builders was determined by interviewing several Prince George's County sprinkler contractors, who indicated that the per-square-foot cost to install a fire protection system in a single-family home in the County has decreased over the years to under \$2.00 per square foot. This is consistent with a recent NFPA study that found the average cost of installation nationally to be \$1.61 per sprinklered square foot. ❖

## Demographics

Prince George's County, Maryland, is roughly 500 square miles and is situated in close proximity to Washington, DC. Prince George's County has a mixture of light industrial, retail, residential and institutional structures that are protected by the county's fire department. Prince George's County is known for providing affordable

living for many people who commute to work in the Washington, DC area(1).

Most of Prince George's County's population is concentrated in the northern two-thirds of the County(1). The southern part of the County is predominantly rural(1) but urban sprawl has pushed development into these areas, which are affected by Prince George's County's residential sprinkler code. According to Census figures(6), the average population in the County from 1992-2006 was 846,000 residents. In 2007, it was 828,770. The overall population of Prince George's County has grown 11 percent on average since the enactment of the residential sprinkler ordinance(6).

The average median income in Prince George's County in 2004 was \$55,129.00(6). The percentage of home ownership in Prince George's County is 61.8 percent, which is almost 6 percent less than the average for the State of Maryland and in 2008 the median value of a single-family dwelling in Prince George's County is \$145,600(6).



YEAR	POPULATION	% CHANGE	No. of Permits
1992	740,390	N/A	3680
1993	743,156	1.00%	3858
1994	751,282	1.01%	2418
1995	757,795	1.00%	4344
1996	764,644	1.00%	3635
1997	769,840	1.00%	2920
1998	776,907	1.00%	2664
1999	781,781	1.00%	2927
2000	803,291	1.02%	2506
2001	815,203	1.01%	2467
2002	824,365	1.01%	3068
2003	830,513	1.00%	2088
2004	835,021	1.00%	2233
2005	838,156	1.00%	2782
2006	834,660	-1.00%	2233
2007	828,770	-1.00%	1462
		<b>11.05%</b>	<b>45,285</b>

Source: US Census Bureau Estimates

Source: Prince George's County Planning Department Estimates

Since 1992, Prince George's County has issued more than 45,285 building permits for one- and two-family dwellings. The average yearly issuance of one- and two-family dwelling building permits is 3,019.

The Prince George's County Fire Department has 44 stations with a career staff of more than 800 individuals and a volunteer force of 2,000 members. There are 1,200 active emergency responders. In 2007, Prince George's County Fire Department responded to nearly 127,000 calls for service(7). ❖

# Prince George's County Residential Sprinkler Ordinance

In 1987, Prince George's County signed a mandatory fire sprinkler law for all residential structures. This law covered every type of residential dwelling from multi-family structures to townhomes to one- and two-family structures.



This law was to be phased in over the next five years with the final phase requiring all newly constructed single-family structures to be protected by an NFPA 13D fire sprinkler system(1).

The ordinance was phased as follows: one- and two-family model homes were to feature residential fire sprinklers by February 1, 1988. All newly constructed multi-family structures were to have residential fire sprinklers installed by January 1, 1989. In the final phase, January 1, 1992, all newly constructed single-family homes were to be fully protected by an NFPA 13D residential sprinkler system (1). ❖



# Statistical Comparisons

This report consolidates the data collected from Prince George's County Fire Department. The fire department tracked each sprinkler activation by dispatching an on-duty Fire Marshal to the scene. The Fire Marshal was required to complete a Sprinkler Activation Report, which included the type of structure, documentation of the number of sprinklers activated, the potential cause, the type of sprinkler system, the room(s) involved, total dollar value of the property, the estimated dollar loss, and the number of residents present in the structure during activation.

From the years 1992 to 2007, Prince George's County recorded a total of 13,494 single family/townhouse fires and 245 of those were protected by fire sprinkler systems. In those 245 incidents, no deaths were recorded and only six injuries were reported. In the 13,249 fires that occurred in homes that were not protected by sprinklers, 101 residents were killed and 328 were injured. Fire deaths in residential dwellings made up 89% of the fire deaths in Prince George's County during the years.

Four hundred forty-six persons were present in the structures at the time of sprinkler activation. According to the NFPA, the most vulnerable time of day for home fire deaths is between the hours of 10:00 p.m. and 6:00 a.m. Eighty-one occupants were present in their homes during this time period. Another 294 residents were home at the time of sprinkler activation between the hours 6:00 a.m. and 9:59 p.m. Seventy-one residents were home during activation at unrecorded times.

During the study period, there were 45 recorded residential fire deaths between the hours of 6:00 a.m. and 9:59 p.m., 38 recorded residential fire deaths between 10:00 p.m. and 5:59 a.m. and 18 recorded residential fire deaths where the timeframe was not known in residences without sprinklers.

## Fire Deaths and Fire-Related Injuries



These findings clearly show the benefits of an automatic sprinkler system. The most compelling data is that no deaths occurred in any fire where a fire sprinkler system was present. In a tragic contrast, 101 people lost their lives to fires in nonsprinklered home fires during the same period. When one looks at the large number of residents present during fires in sprinklered homes, the protective value of home fire sprinklers is underestimated even more. These residents would have been at a much higher risk of death due to flame and smoke spread had their residences not been sprinklered.

In some of the cases analyzed, residents were impaired or asleep at the time of the fires and were awakened by fire crews. In these instances, the sprinkler system's ability to keep the fire controlled with just one or two sprinklers allowed responding fire crews to rescue the residents in a

## Statistical Comparisons *(continued)*

less hazardous environment. In 96 percent of the 245 reported fire-related sprinkler activations only one or two sprinklers operated.

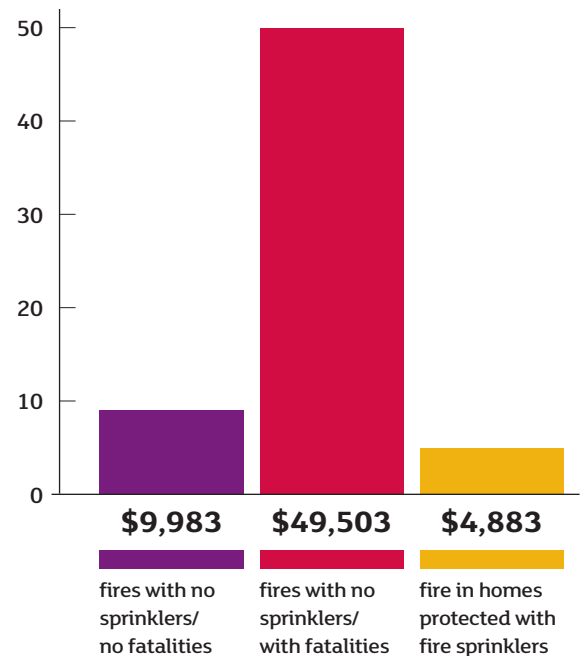
Another important advantage of home fire sprinklers is property protection. From the years 1992 to 2007, Prince George's County Fire Department recorded fire loss for single-family homes and townhouses at \$134,711,199. Property loss from the 245 activated sprinkler events was \$1,352,820. The average loss per event in a structure that did not have a sprinkler system installed averaged \$9,983 per incident. The average fire loss in a structure that was not protected by a sprinkler system and resulted in a fatality came to \$49,503. The average loss for a sprinklered single-family/townhouse structure was \$4,883 per event. (See chart.) This cut the property loss by almost one-half in single-family and townhouse residences and is at least 10 times less than a fatal non-sprinklered residential fire.

The average water output of a residential fire sprinkler is between 13-15 gallons per minute. The average flow from a fire hose is 95 to 200 gallons per minute, under high pressure. Obviously, the activation of a fire sprinkler will create far less water damage.

Another benefit to the residents of Prince George's County is lower insurance costs for homeowners. Having a home fire sprinkler system helps protect the structure and its contents, lowering the replacement risk of the dwelling. When the sprinklered housing stock increases, the overall fire loss will decrease, which potentially decreases the insurance premiums for everyone.

The cost of installing a residential fire sprinkler system has long been debated. A 2008 study by the Fire Protection Research Foundation showed

**Average Property Loss Per Incident**



that the national average cost for fire sprinkler installation is \$1.61 per sprinklered square foot. In the report, the average median sprinkler-protected area of a new construction single-family home is 4,124 square foot, which makes the cost of a full NFPA 13D system \$6,640 for an average sprinklered structure(4). The Research Foundation study used Prince George's County as one of its models and showed that within five years of the ordinance being enacted, the average installation cost dipped below \$1.00 per square foot. At this price point, sprinkler installation should be less than a 5 percent increase over the entire cost of construction for the single-family structure. ❖

## Conclusion

This study shows numerous benefits that residential fire sprinklers provide to the public. Prince George's County's residential sprinkler ordinance has had a significant impact on life safety and reduction of property damage. Prince George's County's experience of suffering no loss of life in a sprinklered home should provide ample justification for other jurisdictions throughout the country to pass similar ordinances. ❖

## References

- 1 **Residential Sprinklers: One Community's Experience Twelve Years after Mandatory Implementation**  
*Fire Chief Ron Siarnicki, Prince George's County Fire Department, January 2001.*
- 2 Source: **National Fire Protection Association: Fire Loss in the U.S. 2007** and **USFA's Firefighter Fatalities in the United States in 2007**
- 3 **Automatic Sprinklers: A 10-Year Study**  
*City of Scottsdale, AZ, Rural/Metro Fire Department and the Home Fire Sprinkler Coalition, 1997.*
- 4 **Home Fire Sprinkler Cost Assessment**  
*The Fire Protection Research Foundation, Newport Partners, 2008.*
- 5 <http://www.realestatemapsmdva.com/princegeorges.shtml>
- 6 <http://www.quickfacts.census.gov/qfd/states/24/24033.html>
- 7 <http://www.co.pg.md.us/Government/PublicSafety/Fire-EMS/index.asp>